EXHIBIT 9

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

ALCATEL-LUCENT USA INC., CIENA CORPORATION, CORIANT (USA) INC., CORIANT NORTH AMERICA, LLC, CORIANT OPERATIONS, INC., INFINERA CORPORATION, FUJITSU NETWORK COMMUNICATIONS, INC., HUAWEI TECHNOLOGIES CO. LTD., AND HUAWEI TECHNOLOGIES USA INC.,
Petitioners,

v.

OYSTER OPTICS, LLC,
Patent Owner.

Case IPR2018-00070
Patent 8,913,898

PATENT OWNER'S RESPONSE

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2006	CONSOLIDATION ORDER in *Oyster Optics, LLC v. Coriant America Inc., et al*., Case 2:16-cv-01302-JRG (E.D. Tex.) issued February 24, 2017
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2202	Order on Joint Motion for Dismissal with Prejudice as to Coriant in *Oyster Optics, LLC v. Coriant America Inc., et al*., Case 2:16-cv-01302-JRG (E.D. Tex.)

Pursuant to 37 C.F.R. § 42.120, Patent Owner Oyster Optics, LLC ("Oyster" or "Patent Owner") files this Response, setting forth reasons why the Board should determine that claims 1-25 of U.S. Patent 8,913,898 (the "'898 patent") are not unpatentable, contrary to the Petition for *inter partes* review ("IPR") filed by Alcatel-Lucent USA Inc., Ciena Corp., Coriant (USA) Inc., Coriant North America, LLC, Coriant Operations, Inc., Infinera Corp., Fujitsu Network Communications, Inc., Huawei Technologies Co. Ltd., and Huawei Technologies USA Inc. (collectively, "Petitioners"). This Response is also accompanied and supported by the Declaration of Professor Keith W. Goossen, Ph.D. (Ex. 2033).

I. INTRODUCTION

The '898 patent discloses a transceiver card that includes a transmitter having a laser, a fiber output, a separate fiber input, a receiver, and an energy level detector that measures an energy level of an optical signal received via the fiber input. Per the challenged claims in this proceeding, the energy level detector includes a plurality of thresholds or a threshold that indicates a drop in amplitude of the received signal.

Petitioners' challenges uniformly fail because the prior art relied upon does not disclose or suggest the novel structure recited in the claims. The primary reference of Grounds 1a and 1b, Corke,[1] has redundant routes A and B between

[1] Ex. 1206, U.S. Patent No. 5,510,917 to Corke ("Corke").

nodes, but uses a single fiber on each route for both transmitting and receiving signals (bidirectional fiber). Corke therefore fails to disclose a fiber input and a fiber output of any transceiver card. Petitioners propose to modify Corke with secondary reference Swanson,[2] to include separate fiber pairs per route. But Corke determines whether a route's fiber is suitable for transmission based on the intensity of the signal received via that same fiber. As such, a person of ordinary skill in the art ("POSITA") would not have modified Corke to use two unidirectional fibers on each route, as Corke would then be selecting a transmission route without knowing the condition of the fiber on each route. This is in direct violation of Corke's teaching, which stresses the importance of not only monitoring the signal quality on each fiber, but also monitoring the signal quality for each wavelength. As Dr. Goossen confirms, Petitioners' proposed modification of Corke is completely inconsistent with Corke's teaching, and would not have been implemented by a POSITA. Ex. 2033, ¶¶28-51.

Further, Petitioners and Dr. MacFarlane, Petitioners' technical declarant, failed to consider this shortcoming of the proposed combination. On cross-examination, Dr. MacFarlane discussed his annotation of Corke's Figure 4 containing his proposed modification. He explained that the additions he made to Corke's Figure 4 "were certainly to connect optical fibers for transmission to

[2] Ex. 1207, U.S. Patent No. 6,433,904 to Swanson et al. ("Swanson").

switch 7," and also noted that "switch 7 in the annotated Corke figure 4 is being asked to do more things than the switch in figure 4 of the '917 patent." Ex. 2032, 66:5-67:5; 67:11-22. Nevertheless, when asked if his declaration contained a discussion of switch 7's operation, he responded: "I do not explicitly describe the operation of switch 7 in annotated figure 4 in my declaration." Ex. 2032, 68:15-22; *see also* Ex. 2032, 71:22-72:2; 72:11-73:15. He then raised a new theory not reflected in his annotation of Corke's Fig. 4, discussed in his declaration, or advanced in the Petition. Any new theory Petitioners and Dr. MacFarlane pursue in a reply will be improper and cannot be considered. 37 C.F.R. § 42.23(b).

Petitioners' Ground 1a/1b challenges fail for additional reasons, including Petitioners' improper interpretation of Swanson's disclosure regarding interface cards. Swanson discloses that an interface card (or cards) could have both a transmitter and a receiver, but Petitioners stretch this disclosure to an unreasonable limit in order to fit an entire node of Corke's system onto a card. The result is that Petitioners fail to demonstrate that a POSITA would find obvious the transceiver card set forth in the claims, including a transmitter with an energy level detector arranged on the transceiver card, and separate input and output fibers. The proposed combinations also lack the features of the claimed energy level detector, including a plurality of thresholds and a threshold indicating a drop in amplitude of an optical signal.

The additional secondary reference of Ground 1a, Chikama,[3] is not relied upon by Petitioners to disclose or suggest these absent features of a single transceiver card as claimed in independent claims 1 and 14, and does not remedy the underlying deficiencies of Petitioners' proposed combination of Corke and Swanson.

The primary reference of Grounds 2a, 2b, and 2c, Choy, [4] also fails to disclose or suggest a transceiver card having all claimed features. Petitioners look to modify Choy's laser/receiver card (LRC) to include a preamplifier and a tunable bandpass filter according to DeSalvo,[5] but Choy and DeSalvo are directed to distinct schemes for demultiplexing received signals. Indeed, Choy's LRC receives an optical signal that is already demultiplexed, and passes that signal directly to a PINFET detector for converting into an electrical signal. On the other hand, DeSalvo's printed circuit card assembly receives a multiplexed signal that requires amplification and filtering to select a single channel before passing the filtered signal to its optical-to-electric conversion circuit 36. A POSITA faced

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[3] Ex. 1208, Chikama et al., "Modulation and demodulation techniques in optical heterodyne PSK transmission systems," in Journal of Lightwave Technology, vol. 8, no. 3, pp. 309-322, Mar 1990 ("Chikama").

[4] Ex. 1210, U.S. Patent No. 5,825,949 to Choy et al. ("Choy").

[5] Ex. 1211, U.S. Patent No. 6,980,747 to DeSalvo et al. ("DeSalvo").

with Choy would not have looked to DeSalvo's disparate scheme to incorporate unnecessary amplification and filtering, and in fact would have found DeSalvo's preamplifier and tunable bandpass filter duplicative of features already possessed by Choy.

Casting serious doubt on the logic behind Petitioners' proposed modification of Choy in view of DeSalvo, at deposition Dr. MacFarlane was either unable or unwilling to annotate a clean copy of Choy's Fig. 3A to add the preamplifier and tunable bandpass that he proposed to incorporate into Choy from DeSalvo. Ex. 2032, 125:20-128:8. This occurred even though Dr. MacFarlane testified that he had been preparing for deposition for roughly two weeks, and that he spent the majority of his time reviewing his declaration. Ex. 2032, 9:16-18; 10:2-11:2. He also confirmed that he reviewed Choy and DeSalvo in preparation for his deposition. Ex. 2032, 98:2-4.

When asked why he would not draw his proposed modification, he explained that he didn't "feel comfortable drawing in exact[ly] all the connections." Ex. 2032, 126:17-18. He was then asked "How many connections are needed?" Ex. 2032, 126:20. Without ever answering the question, he stated instead, "I'd have to think about that." While he claimed that he thought about that question "to some extent" while preparing his declaration (Ex. 2032, 127:2), he

remained unable[6] or unwilling to recreate his theory for combining Choy at DeSalvo at deposition.

The additional secondary references, Takahashi,[7] Reiner,[8] and Fatehi,[9] are not relied upon by Petitioners to disclose or suggest the missing features of a single transceiver card from the asserted grounds, and in any event they do not remedy the underlying deficiencies of Petitioners' proposed combinations.

Petitioners' challenges against the dependent claims fail for the same reasons that the challenges against independent claims 1 and 14 fail, and also contain additional flaws. For example, claims 13 and 25 of the '898 patent disclose the use of an optical time-domain reflectometer ("OTDR") and an optical splitter for OTDR signals on the transceiver card. To challenge these dependent claims, Petitioners' Ground 1b attempts to modify the combination of Corke, Swanson, and Chikama in view of the Mock[10] reference to add a monitoring

[6] "Q: But you can't draw it, sitting here in front of me today?"

"A: That's correct."

Ex. 2032, 127:3-5.

[7] Ex. 1212, U.S. Patent No. 5,680,246 to Takahashi et al. ("Takahashi").

[8] Ex. 1213, U.S. Patent No. 4,419,595 to Reiner ("Reiner").

[9] Ex 1214, U.S. Patent No. 4,878,726 to Fatehi ("Fatehi").

[10] Ex. 1209, U.S. Patent No. 5,790,285 to Mock ("Mock").

feature. But Mock fails to disclose a transceiver card having the claimed "splitter" for an OTDR as required by these claims, and instead includes wave division multiplexers (WDMs) in a separate SLGX switch assembly housing, separate from any transmitter or receiver of Mock. Indeed, Dr. MacFarlane conceded at deposition that he had not considered the importance of Mock's disclosure that its WDMs are arranged in an SLGX switch assembly housing, and not on a transceiver card. Ex. 2032, 97:6-13. Therefore, these challenges also fail.

Additionally, the USPTO has already decided that the '898 patent claims are patentable over two of the asserted references, Chikama and Choy. Petitioners failed to disclose to the Board that these two references were already considered by the Examiner during prosecution. In now asking the Board to reconsider the Examiner's correct decision to allow the '898 patent over these references, Petitioners make no attempt to show that their interpretation of Chikama or Choy is different than how the Examiner interpreted them.

Each of these defects, and other defects in the asserted challenges, are addressed below.

II. BACKGROUND

A. Overview of U.S. Patent No. 8,913,898

The '898 patent was filed on February 5, 2013 and issued on December 16, 2014. The '898 patent is a continuation of U.S. Patent Application No.

12/590,185, filed on November 4, 2009 (now issued as the '511 patent), which is a continuation of U.S. Patent Application No. 10/188,643, filed on July 3, 2002 (now issued as the '327 patent), and claims the benefit of U.S. Provisional Patent Application No. 60/303,932, filed on July 9, 2001. Therefore, the '898 patent is not expected to expire prior to any Final Written Decision in this IPR. *See* 35 U.S.C. § 154(a)(2); 37 C.F.R. § 42.100(b).

The '898 patent is entitled "Fiber Optic Telecommunications Card with Energy Level Monitoring." The challenged claims 1-25 of the '898 patent relate generally to fiber optic telecommunications, and more particularly to a transceiver card for a telecommunications box having specific components for performing fiber optic communications with another remotely located transceiver. The transceiver card includes a transmitter having a laser, a modulator, and a controller; both a fiber input and a fiber output; two splitters respectively associated with an energy level detector and with an optical time-domain reflectometer ("OTDR"); and a receiver. The energy level detector measures an energy level of a received optical signal. The modulator modulates light from the laser as a function of input data, and thereby generates a first optical signal for transmission. The energy level detector includes a plurality of thresholds (according to claim 1) and a threshold indicating a drop in amplitude of the second optical signal (according to claim 14).

FIG. 1 of the '898 patent depicts how a telecommunications box 2 for an optical multiplexor can be refitted with a transceiver card 1 consistent with the invention of the '898 patent. In the depiction of Fig. 1 (emphasis added), faceplate 9 has a fiber connector 109 for connecting to an output fiber 110 and an input fiber 111. '898 patent, 4:11-29. Fiber 110 and fiber 111 extend from box 2 to provide telecommunications (highlighted by a red oval).

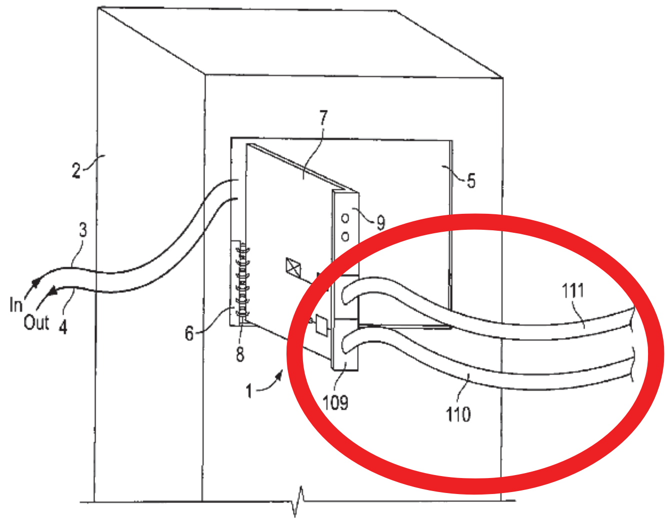


FIG. 1

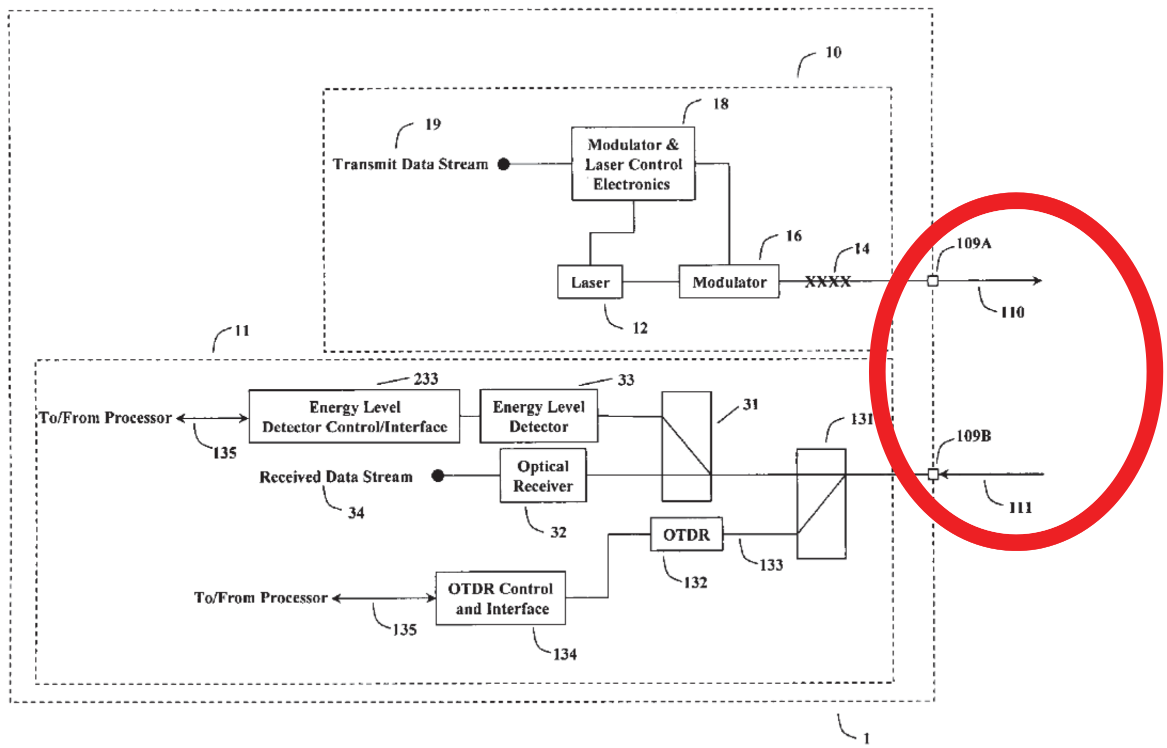


Figure 2

Figure 2 shows an exemplary embodiment of transceiver card 1, including the components arranged on the same transceiver card 1, in more detail (emphasis is again provided to separate outgoing fiber 110 and incoming fiber 111 with a red oval). Transmitter 10 includes a laser 12 on the transceiver card 1 and modulator 16. Light emitted from the laser 12 passes through the modulator 16 and is modulated according to the controller 18. Specifically, an electronic controller 18 receives input data 19, and controls modulator 16 to modulate the light from laser 12 as a function of the input data 19. '898 patent, 4:30-43. The transmitter can operate in a phase-modulated mode. In this manner, transmitter transmits

modulated optical signals over the outgoing optical fiber 110 via output 109A. *Id.*, 4:44-52.

Optical signals transmitted to transceiver card 1 are received at input connector 109B from incoming fiber 111. Receiver 11, also arranged on the card 1, includes two coupler/splitters 31 and 131, each functioning as a splitter. Splitter 131 allows optical time-domain reflectometer ("OTDR") 132 on transceiver card 1 to be commanded to continuously operate without interruption or corruption of the received data stream 34. Splitter 31 splits off a portion of the remaining other light, directing part of the optical energy to an energy level detector 33 and passes the residual light to an optical receiver 32. Optical receiver 32 converts the optical signal to electronic form to recover the electronic data stream 34 as appropriate for the optical modulation technique employed. '898 patent, 4:55-5:5.

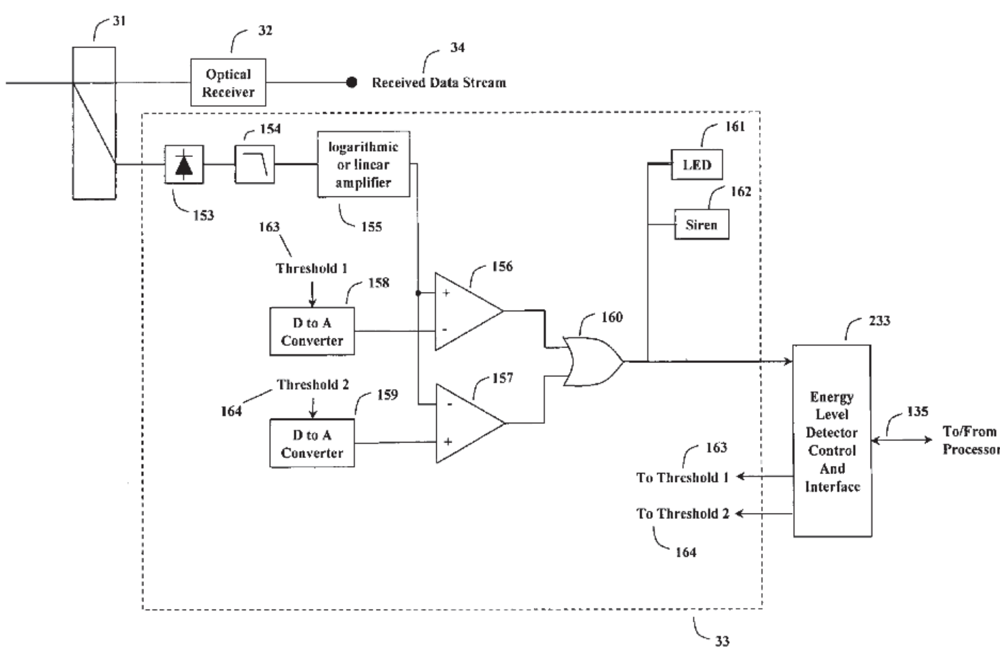


Figure 3

The challenged claims of the '898 patent include an "energy level detector" arranged on the transceiver card, an embodiment of which is shown above in Figure 3. There, energy level detector 33 is optically connected between the receiver 32 and fiber input 111 (optical connection shown as 31). Energy level detector 33 monitors the light energy in the fiber 111 via the light energy diverted to the detector by splitter 31. The energy level detector 33 monitors the incoming light energy in the input optical fiber 111 to indicate a potential optical tap, tampering, or other degradation of the optical signal. A photodetector converts an optical signal into an electrical signal. A low pass filter 154 may filter the electrical signal to provide a signal representing an average optical power. After filtering the signal, the signal representing the average optical power may be conditioned and scaled by either a logarithmic or linear amplifier 155. The configuration allows digital operation regardless of the span length of the optical fiber. *Id.*, 5:11-46.

After being scaled by the linear or logarithmic amplifier 155, the electrical signal is compared to reference voltages by one or more comparators. Comparator 156 will transition from a low to high output when the voltage output from the logarithmic or linear amplifier 155 exceeds a reference voltage, or upper threshold 163, established by the digital to analog (D to A) converter 158. Conversely, comparator 157 will transition from a low to high output when the voltage output

from the logarithmic or linear amplifier 155 falls below the reference voltage, or lower threshold 164, established by the digital to analog converter 159. The output of OR gate 160 will transition from low to high when the output of either comparator 156 or comparator 157 transitions from low to high. When the output of OR gate 160 is high, an alarm may be triggered to indicate that one or more thresholds has been crossed. *Id*., 5:60-6:20.

Elements of an exemplary system are claimed in claims 1-25 of the '898 patent, reproduced below.

B. Claims in Dispute

In full, challenged claims 1-25 of the '898 patent recite (with the highlighting of the elements to be addressed below):

> 1. A ***transceiver card*** for a ***telecommunications box for transmitting data over a first optical fiber and receiving data over a second optical fiber***, ***the transceiver card comprising***:
>
> a ***transmitter having a laser***, a modulator, and a controller configured to receive input data and control the modulator to generate a first optical signal as a function of the input data;
>
> a ***fiber output*** optically connected to the transmitter and configured to ***optically connect the first optical fiber to the transceiver card***;

a receiver configured to receive a second optical signal from the second optical fiber and to convert the second optical signal to output data;

fiber input optically connected to the receiver and configured to ***optically connect the second optical fiber to the transceiver card***; and

an ***energy level detector optically connected between the receiver and the fiber input to measure an energy level of the second optical signal***, wherein the energy level detector includes ***a plurality of thresholds***.

2. The transceiver card as recited in claim 1 wherein the energy level detector includes an OR gate.

3. The transceiver card as recited in claim 1 wherein the modulator is a phase modulator.

4. The transceiver card as recited in claim 3 wherein the second optical signal comprises a phase modulated optical signal.

5. The transceiver card as recited in claim 1 wherein the energy level detector includes a photodiode and a ***linear or logarithmic amplifier scaling an output of the photodiode***.

6. The transceiver card as recited in claim 1 wherein the thresholds are programmable.

7. The transceiver card as recited in claim 1 wherein the energy level detector includes a detector controller capable of setting values for the thresholds.

8. The transceiver card as recited in claim 7 wherein ***the detector controller receives an indication of a threshold being crossed***.

9. The transceiver card as recited in claim 1 wherein the plurality of thresholds bound an acceptable energy range for the received second optical signal.

10. The transceiver card as recited in claim 1 wherein ***the plurality of thresholds indicate a drop in amplitude*** of a phase-modulated signal.

11. The transceiver card as recited in claim 1 wherein the plurality of thresholds indicate an increase in an optical energy level.

12. The transceiver card as recited in claim 1 wherein the energy level detector measures optical power.

13. The transceiver card as recited in claim 1 further comprising ***a first splitter splitting the optical signal to the energy level detector, and a second splitter for an OTDR***.

14. A ***transceiver card*** for ***a telecommunications box for transmitting data over a first optical fiber and receiving data over a second optical fiber***, ***the transceiver card comprising***:

a ***transmitter having a laser***, a modulator, and a controller configured to receive input data and control the modulator to generate a first optical signal as a function of the input data;

a ***fiber output*** optically connected to the transmitter and ***configured to optically connect the first optical fiber to the transceiver card***;

a receiver configured to receive a second optical signal from the second optical fiber and to convert the second optical signal to output data;

a ***fiber input*** optically connected to the receiver and ***configured to optically connect the second optical fiber to the transceiver card***; and

an ***energy level detector configured to measure an energy level of the second optical signal***, the energy level detector including a ***threshold indicating a drop in amplitude*** of the second optical signal.

15. The transceiver card of claim 14 ***wherein the energy level detector is optically connected between the receiver and the fiber input***.

16. The transceiver card as recited in claim 14 wherein the energy level detector includes an OR gate.

17. The transceiver card as recited in claim 14 wherein the modulator is a phase modulator.

18. The transceiver card as recited in claim 14 wherein the second optical signal comprises a phase-modulated optical signal.

19. The transceiver card as recited in claim 14 wherein the energy level detector includes a photodiode and a ***linear or logarithmic amplifier scaling an output of the photodiode***.

20. The transceiver card as recited in claim 14 wherein the threshold is programmable.

21. The transceiver card as recited in claim 14 wherein the energy level detector includes a detector controller capable of setting a value for the threshold.

> 22. The transceiver card as recited in claim 21 wherein the detector controller receives an indication of the threshold being crossed.
>
> 23. The transceiver card as recited in claim 14 wherein the plurality of thresholds bound an acceptable energy range for the received second optical signal.
>
> 24. The transceiver card as recited in claim 14 wherein the energy level detector measures optical power.
>
> 25. The transceiver card as recited in claim 14 further comprising ***a first splitter splitting the optical signal to the energy level detector, and a second splitter for an OTDR***.

'898 patent, 6:52-8:42.

C. Claim 14's Preamble Should Be Treated As Limiting

As introduced above, claim 14's preamble recites: "A transceiver card for a telecommunications box for transmitting data over a first optical fiber and receiving data over a second optical fiber, the transceiver card comprising … ." As the Board correctly noted in its Institution Decision, the "transceiver card," "first optical fiber," and "second optical fiber" should be treated as limiting. Paper 14, 19.

A preamble is limiting if it recites essential structure that is important to the invention or necessary to give meaning to the claim. *NTP, Inc. v. Research In Motion, Ltd.*, 418 F. 3d 1282, 1305–06 (Fed. Cir. 2005); *SanDisk Corp. v. Memorex Prods., Inc.*, 415 F.3d 1278, 1284 n.2 (Fed. Cir. 2005) (*citing Pitney Bowes, Inc. v. Hewlett-Packard Co.*, 182 F.3d 1298, 1305 (Fed. Cir. 1999)). Further, "[w]hen limitations in the body of the claim rely upon and derive antecedent basis from the preamble, then the preamble may act as a necessary component of the claimed invention." *Eaton Corp. v. Rockwell Int'l Corp.*, 323 F.3d 1332, 1339 (Fed. Cir. 2003).

Here, the terms "the transceiver card," "the first optical fiber," and "the second optical fiber" in the body of claim 14 find their antecedent bases in the preamble. As such, the Board should interpret at least these features of claim 14's preamble as limiting.

III. THE STATUTES GOVERNING INTER PARTES REVIEW AND BOARD REGULATIONS REQUIRE THAT THIS PROCEEDING BE DISMISSED

The Petition advanced five separate challenges against claims 1-25 of the '898 patent, and yet the Board instituted on all challenges and all claims despite having evaluated only a single claim of a single ground. *See* Paper 14. In this manner, the Board's Decision unlawfully deviated from the Agency's regulations requiring a claim-by-claim and ground-by-ground evaluation of the Petition. The

PTO issued its statutorily-required regulations requiring a thorough evaluation of a petition to promote efficiency (as it would allow a patent owner, petitioner, and the public to know the Board's thinking on each of the challenged claims and ground, which could be used to focus the proceeding on key disputed issues). The Board cannot simply disregard the PTO's prior rulemaking, even in view of *SAS Institute Inc. v. Iancu*, 584 U.S. ___, 138 S. Ct. 1348 (2018). By proceeding in a manner contrary to the PTO's existing regulations, the Board unlawfully proceeded in the absence of the rulemaking required by statute.

Further, because the Board did not evaluate every ground and every challenged claim, the Petition was improperly instituted. Under 37 C.F.R. § 42.108(c), the Board's governing regulation, "*Inter partes* review ***shall not be instituted*** for a ground of unpatentability ***unless*** the Board decides that the petition supporting the ground would demonstrate that there is a reasonable likelihood that at least one of the claims challenged in the petition is unpatentable." (emphasis added). Nevertheless, the Board's Decision on Institution (Paper 14) disregarded nearly all of Patent Owner's reasons and evaluated only a single claim—claim 14—against the Petition's Ground 1a. Paper 14, 20-38. Importantly, the Board never determined, contrary to its rules, whether Petitioners established a reasonable likelihood of prevailing on all challenged claims and all grounds.

In 2012, prior to *SAS Institute Inc. v. Iancu*, 584 U.S. ___, 138 S. Ct. 1348 (2018), the Director implemented the regulations required by statute (35 U.S.C. 316) in a manner that ***required*** claim-by-claim and ground-by-ground evaluation and permitted claim-by-claim and ground-by-ground institution. *See* 37 C.F.R. § 42. In particular, 37 C.F.R. § 42.108(a) allowed the Board to "authorize the review to proceed on all or some of the challenged claims and on all or some of the grounds of unpatentability asserted for each claim." Additionally, 37 C.F.R. § 42.108(b) allowed the Board to "deny some or all grounds for unpatentability for some or all of the challenged claims" prior to institution of *inter partes* review. When denying a ground, 37 C.F.R. § 42.108(b) stated that such a "[d]enial of a ground is a Board decision not to institute *inter partes* review on that ground." Moreover, under the heading "Sufficient grounds," 37 C.F.R. § 42.108(c) provided that "*Inter partes* review ***shall not be instituted for a ground of unpatentability*** unless the Board decides that the petition supporting the ground would demonstrate that there is a reasonable likelihood that at least one of the claims challenged in the petition is unpatentable." (emphasis added).

In implementing these final rules, the Agency stated, "The Board will identify the grounds upon which the review will proceed on a claim-by-claim basis. Any claim or issue not included in the authorization for review is not part of the review." *See* 77 Fed. Reg. 48,689. Indeed, the Agency specifically stated that

the regulations ***did not adopt*** comments requesting that "all challenged claims to be included in the *inter partes* review when there is a reasonable likelihood of prevailing with respect to one challenged claim." *See* 77 Fed. Reg. 48,702-03.

Post-*SAS*, and though required under 35 U.S.C. § 316(a)-(b), the Agency has not issued new rules that would permit the Board to institute all grounds against all challenged claims without also determining whether a petitioner established a reasonable likelihood of prevailing on all challenged claims and all grounds. Specifically, *SAS* requires that the Board's decision on institution be binary; the Board can either institute on all grounds or deny all grounds. However, the PTO's binding regulations only permit a challenge to go forward if it satisfies the "reasonable likelihood" standard. Therefore, *SAS* and the Board's regulations require that a petition for *inter partes* review be denied unless every challenge against every claim meets the threshold. The Board has not completed that review here.

SAS cannot be read to endorse the Board's approach of evaluating only one claim and one ground in this case. The Supreme Court states: "Once that single claim threshold is satisfied, it doesn't matter whether the petitioner is likely to prevail on any *additional* claims; the Director need not even consider any other claim before instituting review." *SAS Institute*, 138 S. Ct. at 1356. But in truth, whether the Director ***needs*** to consider more than one claim before instituting

review must be answered through the procedures set forth by statute in 35 U.S.C. § 316(a)-(b), which *SAS* did not disturb. More importantly, whether the Director ***needs*** to consider more than one claim before instituting review is not the right question here. Rather, the right question here is whether the Director has informed the public that he ***will*** consider all the claims and grounds before instituting review. The answer to that question is, undeniably, yes, and that answer is still binding on this Board. *See Reuters Ltd. v. FCC,* 781 F.2d 946, 950-51 (D.C. Cir. 1986).

Under 37 C.F.R. § 42.108(c), the Agency has informed the public, after consideration of the statutorily-required policy factors, that "*Inter partes* review ***shall not be instituted for a ground of unpatentability*** unless the Board decides that the petition supporting the ground would demonstrate that there is a reasonable likelihood that at least one of the claims challenged in the petition is unpatentable." (emphasis added). The Board's decision to deviate from this existing rule here is contrary to the mandate of 35 U.S.C. § 316(b) and the Director's adopted policy for implementing *inter partes* review required under 35 U.S.C. § 316(a), and is impermissible under the law. In effect, the Board has substituted its own judgment for the statutorily- required rulemaking and Director's consideration of specifically enumerated policies. This is an error and the Petition cannot proceed to final written decision.

IV. THE CHALLENGED CLAIMS ARE NOT UNPATENTABLE

Petitioners have failed to establish that each of the challenged '898 patent claims are unpatentable over the asserted art. Petitioners' improper combinations, whether based primarily on Corke or Choy, lack motivation, rely on incorrect interpretations of each primary reference and, in any event, fail to disclose all of the claimed features, including the claimed requirement to arrange the recited elements on a single "transceiver card." Additionally, Petitioners' proposed combinations are inconsistent with the teachings of the underlying references and would not have been implemented by a POSITA.

For these reasons, and as discussed in more detail below, the Board should conclude that the challenged claims are not unpatentable in light of Petitioners' challenges.

A. Grounds 1a and 1b Fail

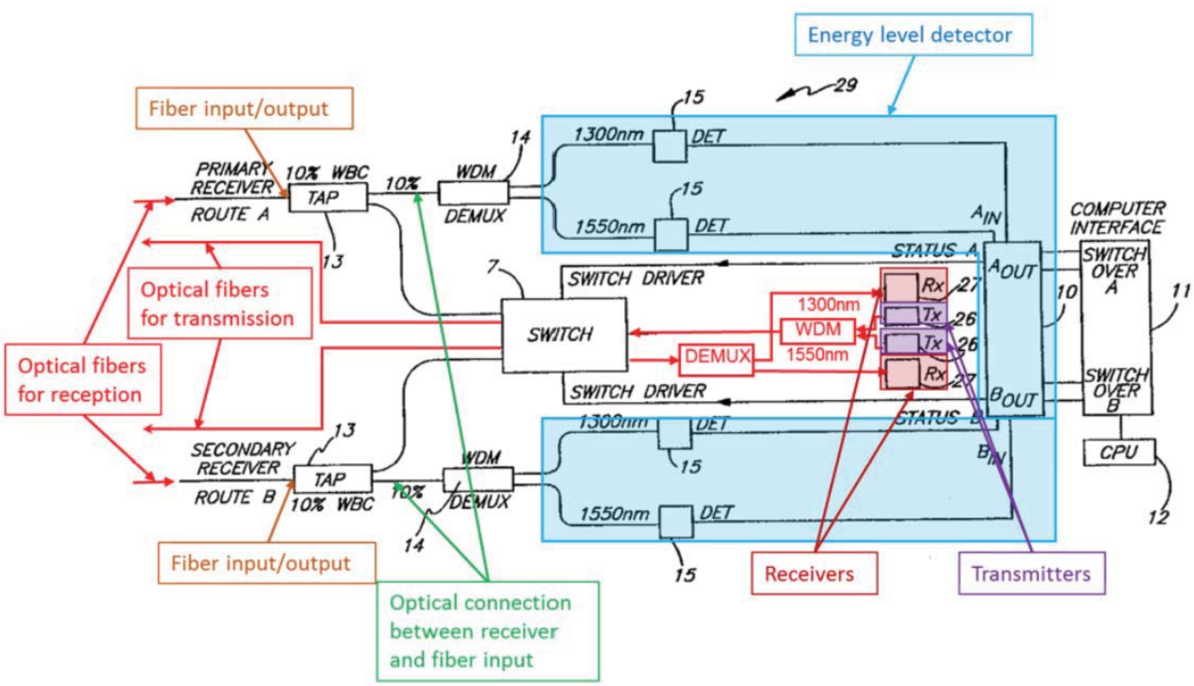
1. Grounds 1a and 1b Also Fail as Petitioners Provide No Valid Motivation Justifying Modification of Corke to Add Separate Transmit and Receive Optical Fibers Based on Swanson

Claims 1 and 14 require a "first optical fiber" associated with transmission and a "second optical fiber" associated with a receiver. '898 patent, 6:59-61, 6:65-67, 8:1-3, 8:7-9. Corke, as admitted by Petitioners, uses a "single fiber" and, thus, fails to disclose these elements of claims 1 and 14. *See* Pet., 28 ("Corke shows a single fiber for bi-directional communication … ."); *see also* Ex. 2032, 36:13-37:1.

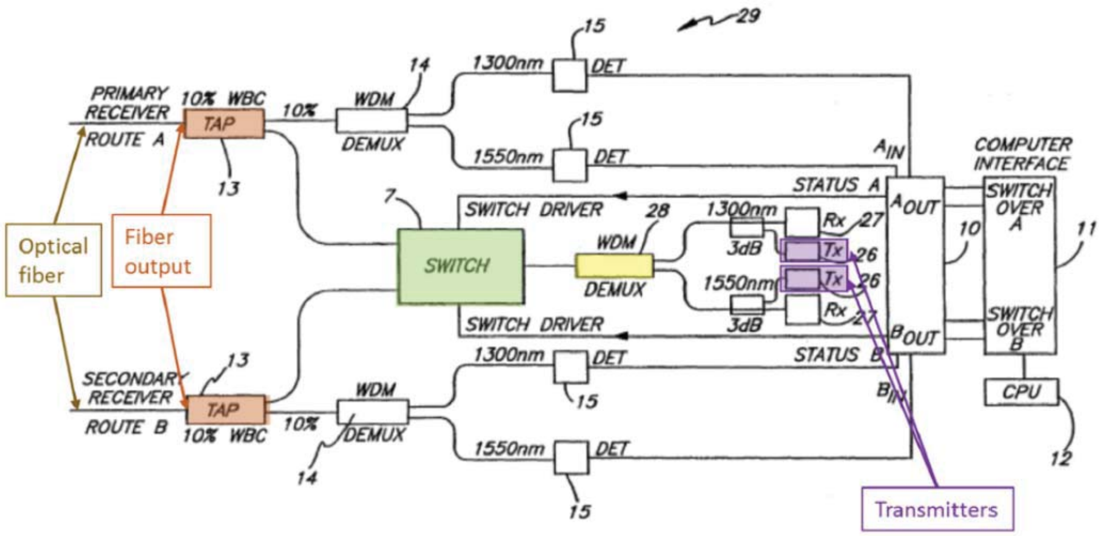
In an attempt to remedy this clear defect, Petitioners allege that based on

Swanson, "a POSITA would have found it obvious, in view of Swanson's disclosure, that Corke's optical device could be implemented in a physical transceiver card, and that the device could include two separate fibers for transmission and reception." Pet., 22 (citing Pet., § IV.D). Section IV.D of the Petition points to Swanson's disclosure of fiber arrangements. Pet., 9 (quoting Swanson, 4:19-24). Swanson specifically discloses that "[t]o achieve bidirectional transmission, either two fibers can be used (one transmitting in each direction), or one fiber can be used with the eastbound and westbound traffic on different wavelengths." Swanson, 4:21-24.

Dr. MacFarlane envisions that a combination of Corke and Swanson would result in a re-designed version of Corke's Fig. 4 (Ex. 1202, ¶122), shown below and referred to by the Board as Annotated Corke Figure 4 (Paper 14, 27):



Petitioners analyze a differently annotated version of Corke's Fig. 4 (Pet., 26-27), shown below:



Corke, FIG. 4 (annotated)

While Dr. MacFarlane connects the added transmission fibers to switch 7, the Petition argues "the port therefore optically connects, ***using tap coupler 13***, the primary route fiber (and similarly, the secondary route fiber), to transmit circuit 26 in optical device 29." Pet., 27 (emphasis added).

In either case, these modifications of Corke deviate fatally from Corke's teaching, and a POSITA faced with Corke's system and Swanson's two-fiber embodiment disclosure ***would not*** have replaced Corke's single, bidirectional fiber with separate fibers. Ex. 2033, ¶¶28-51.

In particular, and as explained below, Petitioners fail to recognize the

benefits that Corke achieves through the use of single, bidirectional fibers; these benefits would be lost—for no good reason and in contradiction of the teachings of Corke—through replacement with separate transmit and receive fibers on each route.

a) A POSITA Would Not Have Modified Corke to Include Fiber Pairs on Each Route, as Alleged by Petitioners

As introduced above, claim 1's preamble recites in part, "A transceiver card for a telecommunications box for transmitting data over a first optical fiber and receiving data over a second optical fiber." The body of claim 1 further requires the claimed "transceiver card" to comprise (in relevant part) "a ***fiber output*** optically connected to the transmitter and configured to optically connect the ***first optical fiber*** to the transceiver card," and "a ***fiber input*** optically connected to the receiver and configured to optically connect the ***second optical fiber*** to the transceiver card." (emphasis added). Claim 14 requires similar features.

Indeed, there is no dispute that claims 1 and 14 require separate transmit and receive optical fibers, as the Board confirmed in its analysis on claim construction:

> We construe the terms "a transceiver card," "a first optical fiber," and "a second optical fiber" in the preambles of claims 1 and 14 to be claim limitations. Those recitations, respectively, provide antecedent bases for the terms "the transceiver card," "the optical fiber," and "the second optical fiber" in the bodies of the claims.

Paper 14, 19; s*ee also* Pet., 21-22, 27; Ex. 1202, ¶¶119, 122, 126, 197.

However, contrary to Petitioners' assertion, a POSITA ***would not*** have modified Corke to transmit data over "a first optical fiber" and receive data over "a second optical fiber" as set forth in the combination of elements recited in claims 1 and 14. Ex. 2033, ¶¶28-51.

Critically, Corke's embodiments showing transmission and reception of optical communications at a common node (*see, e.g*., Figs. 4 and 7) each use a single "primary" fiber on Route A operating bidirectionally and a single "secondary" fiber on Route B, also operating bidirectionally, as confirmed by Dr. MacFarlane at deposition and endorsed by Dr. Goossen. Ex. 2032, 36:13-37:1; *see also* Ex. 2033, ¶28. Corke's decision to use a single, bidirectional fiber for each route represents a critical element of its system. In particular, by monitoring the ***received signal***, Corke is able to determine whether the bidirectional fiber is intact and capable of successfully carrying a ***transmitted signal***. *See* Corke, Abstract ("In bi-directional communication systems, performance of a wave length moving in one direction through a route determines route quality for transmission in the other direction, as well."); *see also* Corke, 3:1-6; 3:19-30; 4:50-62; 9:8-14 (describing Fig. 7); 12:19-26; Ex. 2032, 73:16-74:17; Ex. 2033, ¶¶31-33. This allows Corke to evaluate the bidirectional fiber quality, and switch to a redundant fiber for transmission and reception if the primary bidirectional fiber is damaged or

severed as determined by the detected average intensity of the received signal. Corke, 1:11-17; 5:42-44; *see also* Ex. 2032, 45:6-46:8; Ex. 2033, ¶¶31-33.

This feature of using received signals to control the route for transmitted signals is reflected in Corke's preferred bidirectional embodiments. Ex. 2033, ¶¶31-33. In describing Fig. 7, Corke discloses that "[i]f the route A cable is disturbed or severed, the 1550 nm monitor system detects that condition and automatically switches to route B. The 1330 nm signal travelling in the opposite direction is also directed on to the route B cable." Corke, 9:11-14. Regarding Fig. 8, Corke states, "[i]n this embodiment if route A should fail it would be detected by the detector 44, which is monitoring the signals from the transmitter 30. The control device would make the digital comparison, as described above, and upon determining the intensity at the detector has fallen below the specified digital threshold value it would switch the switch to access route B, (assuming that route B monitored status was acceptable). The signal from the ***transmitter 130*** would then ***automatically be diverted*** through route B to the receiver 151, while the signal from transmitter 30 is received at receiver 50 through route B." Corke, 9:33-45.

In arguing for use of separate input/output fibers in Corke based on Swanson, Petitioners and Dr. MacFarlane fail to recognize Corke's concern with monitoring the performance of bidirectional fiber as a whole for wavelength-

dependent performance degradation. Corke, 8:31-49; Ex. 2033, ¶¶34-37; Ex. 2032, 76:15-22; 82:14-83:6. Corke teaches that "monitoring the combined optical power (at 1300 and 1550 nm) by a single detector can lead to serious signal failure at one wave length, leading to poor BER [bit error rate] performance being undetected." Corke, 8:31-35. This problem is exacerbated in Petitioners' proposed modification, since the transmit fibers are not monitored and could suffer different deterioration than receive fibers. Indeed, both Dr. MacFarlane and Dr. Goossen agree that it is fully possible that a unidirectional transmission fiber, such as that shown in Dr. MacFarlane's Annotated Corke Figure 4, could experience different quality defects than a unidirectional reception fiber in a fiber pair. Ex. 2033, ¶39; Ex. 2032, 83:8-16. Petitioners failed to heed Corke's teaching by seeking to modify Corke to include separate input and output fibers, with the input fibers being unmonitored. This modification would result in Corke's control unit 10 making a determination on which route to use for transmission ***without any data*** to indicate whether either route's transmission fiber is intact, contrary to Corke's teaching. Ex. 2033, ¶¶48, 50.

This modification runs afoul of Corke's teaching to purposefully select a route for both transmission and reception based on the received signal's individual wavelengths. Petitioners would have the control unit 10 deciding on a route for transmission with even less information than was possessed in the prior art that

Corke is improving on. Ex. 2033, ¶¶38, 41-42. A POSITA, taking Corke for all it teaches, would not have been motivated to modify Corke to include separate input/output fibers. Ex. 2033, ¶51.

b) Petitioners and Dr. MacFarlane Should Be Prohibited from Developing a New Theory of Obviousness in Reply

Under the Board's rules, a Reply may only reply to the Patent Owner's Response, and may not present a new theory of obviousness. 37 C.F.R. § 42.23(b). Despite this prohibition, it is clear from Dr. MacFarlane's deposition testimony that new theories are afoot.

First, when asked about the operation of Corke's switch 7 in Figure 4, Dr. MacFarlane confirmed the conditions that would cause switch 7 to shift from the default position (receiving/transmitting via Route A fiber) to the alternate position (receiving/transmitting via Route B fiber). Ex. 2032, 40:20-41:20. However, he previously testified that Corke did not expressly disclose how switch 7 would operate to route signals received from Mux/Demux 28 for transmission, even though the operation of switch 7 does not change for transmission and reception of signals. Ex. 2032, 40:20-41:20.

Second, when asked about his reason to include Annotated Corke Figure 4 (*see* Ex. 1202, ¶122), showing ***two optical fibers for transmission connected to switch 7***, Dr. MacFarlane confirmed that he included this Annotation to illustrate his proposed modification to Corke. Ex. 2032, 64:17-65:4. He also confirmed that

"the additions [he] made were certainly to connect optical fibers for transmission to switch 7." Ex. 2032, 66:5-67:5.[11] This is entirely consistent with the Board's understanding of the purpose for his Annotation, stating in the Institution Decision:

> We understand that Dr. MacFarlane provided Annotated Corke Figure 4 to illustrate how separate optical fibers for transmission and reception would be implemented in Corke. … Petitioner's arguments are understood by reference to Corke's Figure 4, which Petitioner does cite, with the recognition that each bidirectional single optical fiber would have been replaced by two unidirectional optical fibers as illustrated by Annotated Corke Figure 4.

Paper 14, 30. At deposition, Dr. MacFarlane was asked whether he ever described how switch 7 would operate to direct optical signals for transmission according to Annotated Corke Figure 4, and he agreed that he did not include that discussion in his declaration. He admitted instead that he does "not explicitly describe the operation of switch 7 in annotated figure 4 in [his] declaration." Ex. 2032, 68:15-22; *see also* Ex. 2032, 76:15-22; 82:14-83:6; Ex. 2033, ¶49.

Perhaps recognizing the shortcoming in the obviousness theory reflected in

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[11] Dr. MacFarlane reviewed his declaration in preparation for the deposition and confirmed that he found no errors in the declaration, and identified no changes or additions that he would have liked to make. Ex. 3032, 14:5-17.

Annotated Corke Figure 4, Dr. MacFarlane began to contradict himself. His earlier testimony was that he doesn't "remember a specific teaching" in Corke on how switch 7 directs the optical signals it receives from mux/demux 28 (Ex. 2032, 40:20-41:11), but when asked to confirm that he "did not explain how that switch operation … has to be modified in [his] declaration," Dr. MacFarlane stated that "Corke is great at teaching that, so no." Ex. 2032, 72:11-15.

Dr. MacFarlane's testimony then diverged even further from his Annotation's reliance on switch 7 as the connection port for transmission fibers. He stated that "one has to be mindful" that "switch 7 in the annotated Corke figure 4 is being asked to do more things than the switch in figure 4 of the '917 patent." Ex. 2032, 67:11-15. But the alleged "things" that the switch 7 is being asked to do are not discussed in Dr. MacFarlane's declaration or the Petition. Ex. 2032; 68:15-22. Then Dr. MacFarlane shifted theories entirely, and suggested somehow using a 3 dB coupler in lieu of switch 7 for transmission fibers, although that theory was never presented in his original declaration and certainly was not included in his annotation of figure 4. Ex. 2032, 71:3-72:2 ("Q. Where do you show a 3 dB coupler in annotated Corke figure 4? A. I don't."); *see also* Ex. 2032, 72:16-73:15. This is an impermissible shift in theories; it was not included in the Petition or Dr. MacFarlane's declaration, and should be rejected by the Board.

c) Petitioners' Theory of Obviousness is Illogical, Unsupported, and Should be Rejected

As Dr. Goossen notes, a POSITA would have understood that Corke's use of a bidirectional fiber on each route, coupled with the decision-making for transmission based on the received-signal characteristics, allows Corke to select a fiber for transmission with a significantly reduced risk of signal degradation. Ex. 2033, ¶¶31-33, 39-40. Petitioners and Dr. MacFarlane failed to recognize this feature of Corke's invention, and proposed a modification that violates Corke's teachings and would have rendered Corke unsuitable by requiring blind selection of a fiber for transmission. Ex. 2033, ¶41-42. Further, apparently realizing the error of his original theory, Dr. MacFarlane is now developing new theories of obviousness long after the permissible time for doing so.

A POSITA would not have been motivated to modify Corke in view of Swanson's disclosure of separate transmit and receive fibers because doing so would eliminate Corke's ability to determine if a route's fiber for transmission is compromised by monitoring received signals received over that same fiber. Ex. 2033, ¶¶28-51. For these reasons, Petitioners' challenges based on Corke, Swanson, and Chikama fail as to claims 1, 3-8, 10-15, 17-23, and 25, and Petitioners should not be permitted to fabricate a new theory in order to salvage their clearly-deficient theory as contained in the Petition.

2. Grounds 1a and 1b Fail as Petitioners' Proposed Combination Fails to Disclose a Transceiver Card Having an Energy Level Detector

Petitioners' challenges based on Corke in combination with Swanson and Chikama include another fatal flaw. None of Corke, Swanson, or Chikama discloses a "transceiver card" having an "energy level detector" as claimed. As introduced above, independent claims 1 and 14 are directed to a claimed "transceiver card." Further, the transceiver card must include an "energy level detector." '898 patent, 7:1-4, 8:10-13. Indeed, this feature appears in each of the challenged '898 patent claims, either directly or through dependence from independent claims 1 and 14. None of Corke, Swanson, and Chikama discloses or suggests this feature of claims 1 and 14.

a) Corke Discloses Optical Device Connected to Receivers and Transmitters via Ports

Petitioners initially look to Corke for the disclosure of an "energy level detector," referencing Corke's "detectors 15 and a control circuit 10." Pet., 31. However, Corke discloses detectors 15 in an optical device or a "module" having transmit/reception ports or optical connections, and does not disclose detectors 15 on a card. Ex. 2033, ¶60.

As Dr. Goossen explains, the disclosures of Corke support his opinion that receivers and transmitters are separate from and connected to the communication monitoring and control device 6/29 via ports. *Id*.

Corke discloses an optical communication system 1 (Corke, 5:38) having a communication monitoring and control device 6 (Corke, 5:46), and teaches that optical fibers 4 and 5 are "connected" to the device 6. Corke, 5:44-45; Ex. 2033, ¶60. Thus, optical fibers 4 and 5 are not part of the communication monitoring and control device 6. This is consistent with Corke's Fig. 2 embodiment, which explains that the device 6 connects to primary and secondary optic fibers 4 and 5 "at ports" (Corke, 6:3-4), and that signals passing through the wave division multiplexer 16 are received at "ports of receivers 8(a) and 8(b)." Corke, 6:18-21. This is also consistent with Dr. MacFarlane's deposition testimony, where he confirmed that tap couplers 13 in Fig. 2 of Corke "connect the device to respective primary and secondary optical fibers." Ex. 2032, 26:8-18. In describing the system "20" of Fig. 3 and the optical communications control device 29 of Fig. 4, Corke also discloses transmit and receive ports. Corke, 7:64-65 (disclosing "separate transmit and receive ports 26 and 27"); Figs. 3-4 (identifying the transmit and receive ports with the shorthand "Tx" and "Rx"); Corke, 7:60 (identifying "transmit ports 21 and receive ports 22").

Relying on a consistent interpretation of the term, "port," Dr. Goossen opines that just as Corke teaches that fibers 4 and 5 are not part of the communication monitoring and control device 6, Corke's use of the term receiver "ports" also teaches that the receivers to which these signals are delivered are

connected to the communication monitoring and control device 6 via ports, or external connection points. Ex. 2033, ¶¶60-61. Additionally, Corke distinguishes between the "optical monitoring system" and "receiving telecommunications equipment" in claims 14 and 16 (Corke, 12:65-13:4; 13:16-22), and distinguishes between "monitoring and control equipment" and "receiver equipment" in the specification. Corke, 10:67-11:2. As Dr. Goossen notes, these usages confirm that Corke is disclosing the monitoring and control device/equipment to be distinct from the transmit and receive equipment. While Corke does refer to "transmit circuits 26" in reference to Corke's Fig. 4 (Corke, 8:5-10), Dr. Goossen states that "a POSITA would understand that statement as distinguishing Fig. 4 from the device 6 of Figs. 1a and 1b of Corke, which does not include transmit capabilities." Ex. 2033, ¶61.

However, Petitioners fail to appreciate these disclosures and instead treat Corke's monitoring and control device/equipment as integrated with its transmit and receive equipment.

b) Swanson Does Not Disclose or Suggest Arranging Monitoring and Control Equipment on a Transceiver Card

As noted above, Petitioners propose two modifications of Corke based on Swanson, one in an attempt to provide "separate optical fibers" "for transmission and reception," and the other in an attempt to implement Corke's "optical device"

"in a physical transceiver card." Pet., 21-22. But relevant to Petitioners' modification to arrange Corke's monitoring and control device/equipment on a common card its transmit and receive equipment , Swanson discloses only that "[a] bidirectional interface may consist of one card having both a transmitter and a receiver, or it may be packaged on multiple cards." Swanson, 4:31-34. No mention of an "energy level detector" is provided in Swanson. Yet Petitioners argue that "a POSITA would have found it obvious, in view of Swanson's disclosure, that Corke's ***optical device*** could be implemented in a physical transceiver card, and that the device could include two separate fibers for transmission and reception." Pet., 22 (emphasis added). But Swanson specifically does not disclose or suggest arranging an entire "optical device" onto a transceiver card, and only discloses that a transmitter and a receiver could be arranged on a single card (or on multiple cards).

Swanson provides a description of a "prior art point-to-point WDM system 10." Swanson, 3:65-66 (referencing Fig. 1). Swanson refers to "WDM transmitters 14a through 14n," which "convert electrical signals received from the respective data sources 12a-12n to optical signals." Swanson, 4:1-3. Swanson' Fig. 1 also includes "receiver 22," "which optically demultiplexes the optical signal to produce a plurality of optical signals." Swanson, 4:11-12. Swanson then notes that system of Fig. 1 may provide "bidirectional transmission," using "either

two fibers … or one fiber" and that a "bidirectional interface may consist of one card having both a transmitter and a receiver, or it may be packaged on multiple cards." Swanson, 4:19-34.

Swanson, however, does not describe which elements are provided in a receiver that "optically demultiplexes the optical signal to produce a plurality of optical signals." Swanson, 4:11-12. And other elements in Swanson are identified as distinct from receiver 22 in Swanson, including "optical to electrical converters 24a-24n," which "output electrical signals to respective data sinks 26a-26n." Swanson, 4:14-16. Ex. 2033, ¶63. At deposition Dr. MacFarlane mentioned that Swanson's use of forward error correction (FEC) also suggested an energy level detector. Ex. 2032, 50:14-52:3. But Swanson also distinguishes between Receiver 22 and the FEC decoder 42, and in any event, FEC decoder 42 is downstream of the optical-to-electrical converters 24a-24n, and receives electrical signals rather than optical signals. Ex. 2033, ¶64. Accordingly, Swanson does not suggest that "optical to electrical converters" or an FEC decoder are provided on a single card with receiver 22, and Swanson can hardly be relied upon to suggest that the claimed "energy level detector" should be combined on a single card with a receiver.

Applying this teaching to Corke, which also distinguishes between the transmitter ports (Tx) 26 and receiver ports (Rx) 27 from the device containing the

detectors 15, a POSITA would not have been motivated to arrange Corke's detectors 15 and control unit 10 on a transceiver card.

Thus, the motivation presented by Petitioners for allegedly including an energy level detector on a card along with the other elements of claims 1 and 14 cannot withstand scrutiny. Corke fails to support this modification, as do Petitioners' secondary references, Swanson and Chikama.

Accordingly, Petitioners' challenges against claims 1, 3-8, 10-15, 17-23, and 25 based on Corke, Swanson, and Chikama fail for this reason as well.

3. Grounds 1a and 1b Fail as Petitioners' Proposed Combination Fails to Disclose a Transceiver Card Having a Laser

Petitioners' challenges 1a and 1b based on Corke in combination with Swanson and Chikama include another fundamental flaw. As introduced above, independent claims 1 and 14 are directed to a claimed "transceiver card." Further, the transceiver card must include "a transmitter having a laser" on the transceiver card. In proposing a combination of Corke, Swanson, and Chikama, Petitioners gloss over the failure of these references, either alone or in combination, to disclose or suggest this feature of claims 1 and 14.

Corke discloses transmit and receive ports 26 and 27, but do not specifically disclose elements of either. Swanson only discloses a transmitter and a receiver on a transceiver card, but neither discloses nor suggests a "laser." Petitioners then rely on Chikama to disclose phase modulation using a laser and an "external

modulator." Pet., 24-25. Similar to Corke's deficiency in this regard, the Petition does not allege that the laser and "external modulator" of Chikama exists on a "transceiver card."

Petitioners' obviousness conclusion for the "transmitter having a laser" limitation also does not mention placing a "transmitter having a laser" on a "transceiver card." Pet., 25-26. Petitioners allege that "a POSITA would have found it obvious, in view of Chikama, to include a laser in Corke's transmitter that generates optical light, a modulator that modulates the optical output of the laser, and a controller that controls the modulator operation based on data input to the transmitter," without addressing the requirement of placing a laser on the claimed "transceiver card." *Id*. Thus, two of the asserted references of this challenge—Corke and Chikama—fail to disclose this feature of the claims.

As noted above, Petition's analysis of the "transmitter having a laser" element (*see* Pet., 23-26) fails to discuss the Swanson reference. For the sake of completeness, Swanson also fails to support the inclusion of a laser on a transceiver card. Swanson provides a description of a "prior art point-to-point WDM system 10." Swanson, 3:65-66 (referencing Fig. 1). Swanson refers to "WDM transmitters 14a through 14n," which "convert electrical signals received from the respective data sources 12a-12n to optical signals." Swanson, 4:1-3. Swanson' Fig. 1 also includes "receiver 22," "which optically demultiplexes the

optical signal to produce a plurality of optical signals." Swanson, 4:11-12. Swanson then notes that system of Fig. 1 may provide "bidirectional transmission," using "either two fibers … or one fiber" and that a "bidirectional interface may consist of one card having both a transmitter and a receiver, or it may be packaged on multiple cards." Swanson, 4:19-34. Swanson, however, does not describe which elements are provided in a transmitter to "convert electrical signals … to optical signals," and, in particular, there is no disclosure or suggestion of a card with a "transmitter having a laser" in Swanson.

Accordingly, Petitioners' challenges against claims 1, 3-8, 10-15, 17-23, and 25 based on Corke, Swanson, and Chikama fail.

4. Grounds 1a and 1b Fail as Petitioners' Reliance on a Plurality of Detectors, Each with a Single Threshold, Fails to Show the Claimed Single Energy Level Detector Having a Plurality of Thresholds

Petitioners' challenge based on Corke, Swanson, and Chikama fails for another reason. As required by claim 1, "***an*** energy level detector" is provided "to measure ***an energy level*** of the second optical signal" and "***the*** energy level detector includes ***a plurality of thresholds***." '898 patent, 7:1-4. By its plain language, claim 1 requires an energy level detector to measure an energy level of an optical signal and include a plurality of thresholds. This does not encompass multiple energy level detectors for measuring multiple optical signals, where each of the multiple energy level detectors has a threshold. The correct interpretation is

consistent with Fig. 3 of the '898 patent, which depicts multiple thresholds (163, 164) being compared to a measured energy level (output of element 155) (emphasis added):

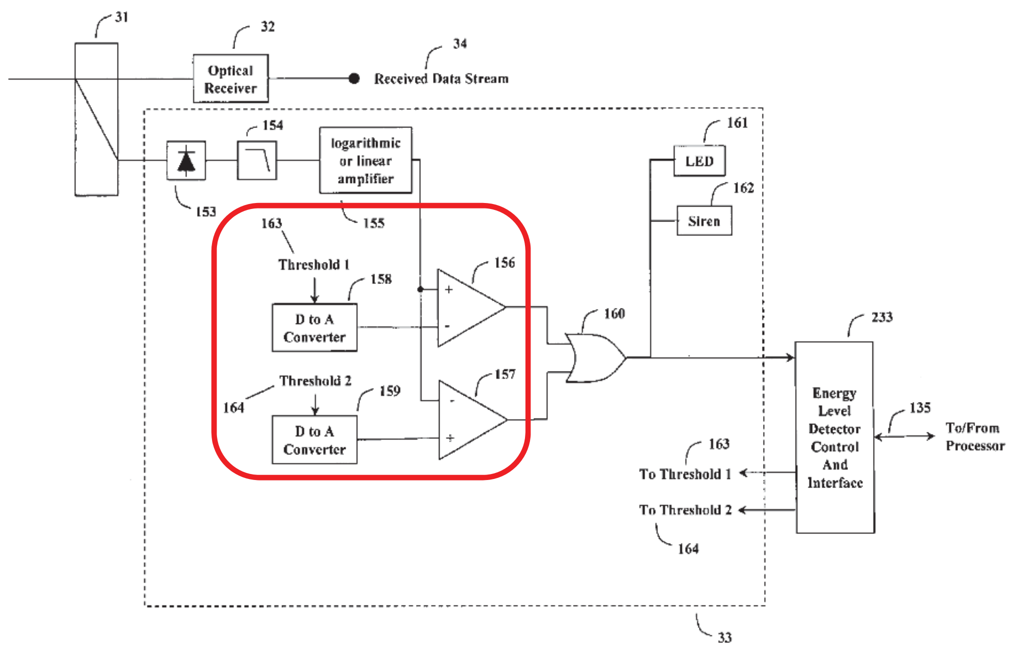

Figure 3

See also '898 patent, 5:60-6:2, 6:14-17. As the claim language and specification are in accord, it is entirely appropriate to construe claim 1 to require that a single detector measure an optical signal and include a plurality of thresholds. *See Harari v. Lee*, 656 F.3d 1331, 1341 (Fed. Cir. 2011) ("When the claim language and specification indicate that 'a' means one and only one, it is appropriate to construe it as such even in the context of an open-ended 'comprising' claim").

Petitioners failed to construe this element, which itself should render their challenge deficient. *See Lemelson v. Gen. Mills, Inc.*, 968 F.2d 1202, 1206 (Fed. Cir. 1992) ("It is elementary in patent law that, in determining whether a patent is

valid and, if valid, infringed, the first step is to determine the meaning and scope of each claim in suit."). Moreover, Petitioners have applied Corke's multiple detectors, each with a single threshold, against this element, seeking to relabel the multiple detectors 15 and a control unit as part of a single "energy level detector circuit." Pet., 31-33. Such an application of Corke to the "energy level detector" element is unreasonable, as such a grouping of Corke's elements would still not show that a plurality of thresholds is associated with a single measurement of an optical signal. Indeed, Petitioners admit that "Corke's ***detectors*** 15 measure the power of received optical ***signals***" and that a control unit compares "power measured by ***each detector*** to '***a*** pre-set level'" (Pet., 32, emphasis added). There simply is no single "detector" in Corke, and no single measurement of an optical signal, that is associated with a plurality of thresholds.

For this reason as well, Petitioners' challenge of claim 1 (and its dependent claims) based on Corke, Swanson, and Chikama fails.

5. Grounds 1a and 1b Fail Because a POSITA Would Not Have Included a Threshold Based on Amplitude in Corke, as Recited in Independent Claim 14 and Dependent Claim 10

Petitioners' challenge based on Corke, Swanson, and Chikama fails for another reason. As required by independent claim 14, the "energy level detector [is] configured to measure an energy level of the second optical signal," and the energy level detector includes "a threshold indicating a drop in amplitude of the

second optical signal." Claim 10, which depends from claim 1, recites that "the plurality of thresholds indicate a drop in amplitude of a phase-modulated signal."

Petitioners assert that the claimed "energy level" feature of claim 14 is disclosed by Corke. Specifically, Petitioners assert that "Corke describes that the detector circuit in its optical device includes detectors 15 to measure power levels of received optical signals." Pet., 33 (*citing* Ex. 1202, ¶¶158-59). More specifically, Corke explains that, "[t]he detector is selected to detect the ***average intensity*** of the signal at the selected wave length for comparison with a threshold value of the minimum signal intensity acceptable." Corke, 2:47-49 (emphasis added). But Petitioners fail to explain how Corke's disclosures relating to average intensity could be interpreted as disclosing the amplitude-based threshold recited in the challenged claims. *See* Pet., 33, 38-39.

Dr. MacFarlane asserts that Corke's "control unit 10 determines if the measured intensity 'drops below a pre-set level'" and states that he "believe[s] that a POSITA would have understood, based on the disclosure of Corke, that Corke teaches that the energy level detector includes 'a threshold indicating a drop in amplitude of the second optical signal,' as recited in claim element [14e]." Ex. 1202, ¶¶159, 176-77. Absent from Dr. MacFarlane's testimony is any sufficient analysis to explain why a measurement of average intensity in Corke's system relates to a "drop in amplitude," or even the relationship between average

"intensity" and "amplitude" in Corke's system (or in the combination of Corke, Swanson, and Chikama asserted by Petitioners). Even assuming a POSITA could measure other characteristics, such as the amplitude of a signal, Petitioners have provided no evidence that a POSITA would have been motivated to measure a drop in amplitude of the signal in the proposed Corke-based combination. *See Polaris Industries, Inc. v. Artic Cat, Inc.*, 882 F.3d 1056, 1068 (Fed. Cir. 2018) (criticizing a focus "on what a skilled artisan would have been *able* to do, rather than what a skilled artisan would have been *motivated* to do at the time of the invention") (emphasis in original) (citing *InTouch Techs., Inc. v. VGO Commc'ns, Inc.*, 751 F.3d 1327, 1352 (Fed. Cir. 2014)).

Further, a POSITA would not have implemented a detector threshold according to signal amplitude in Corke. In systems that employ amplitude modulation, the amplitude of the optical signals drops and rises based on the information to be transmitted. Ex. 2033, ¶55. Generally, in an amplitude modulation system, the amplitude or intensity of a carrier signal is changed between a low and high state to communicate a zero or a one. *Id*.

As Dr. Goossen states, Corke's system employs a form of amplitude modulation. Ex. 2033, ¶56. Phase modulation systems require more components and more complex components, and thus are more costly. *Id*. Corke is mainly considering applications such as cable TV ("CATV," col. 10, line 48), for which

costs must be minimized. *Id*. Indeed, Corke is greatly concerned with reducing cost, as discussed at col. 9, line 18, and col. 6, line 63. *Id*. Thus, Dr. Goossen believes that Corke discloses an amplitude modulation system, and Dr. MacFarlane presents no contrary theory in his declaration. *Id*.

Because the purpose of Corke's intensity threshold is to determine a fault in the fibers of Route A and Route B, Dr. Goossen explains that a POSITA would not have implemented a system to detect a failure triggered by a "drop in amplitude" of an amplitude-modulated optical signal. Ex. 2033, ¶57. A drop in amplitude of an amplitude-modulating signal occurs to communicate the data encoded in the signal to the receiver. *Id*. Corke's detector detects "average intensity," provides a threshold to determine if it falls below the "minimum signal intensity acceptable," but does not set any threshold to detect a "drop in amplitude." The use of an "average intensity" threshold in Corke allows Corke to be used in systems that employ amplitude modulation, but a POSITA would not have modified this threshold to be triggered by a drop in amplitude since that change would have eliminated Corke's monitoring ability in a system that uses amplitude modulation. Ex. 2033, ¶¶57-58.

Accordingly, Petitioners' challenges based on Corke, Swanson, and Chikama fail as to claims 10 and 14, 15, 17-23, and 25 based on these references.

6. Ground 1a Fails as Petitioners' Proposed Combination Fails to Show a "Detector Controller" that "Receives an Indication" of a "Threshold Being Crossed," as Required by Claims 8 and 22

Petitioners' challenge to dependent claims 8 and 22 based on Corke, Swanson, and Chikama also fails. Claims 7, which depends from claim 1, require "a detector controller capable of setting values for the thresholds." Claim 21, which depends from claim 14, requires "a detector controller capable of setting a value for the threshold." Claims 8 and 22, which respectively depend from claims 7 and 21, further require that "the detector controller ***receives*** an indication" of a "threshold being crossed." (emphasis added).

Petitioners rely on the "control unit 10" to satisfy the "detector controller of claims 7 and 21. Pet., 37. Petitioners then note that Corke discloses "digital comparators" and argue that a "POSITA would have found it obvious that … control unit 10 receives the output of the digital comparators." Pet., 38 (*citing* Ex. 1202, ¶¶174-175). But Petitioners ignore that Corke's "digital comparators" are part of control unit 10 and, thus, control unit 10 does not "receive" an indication of a threshold being crossed. The actual location of the comparators in Corke is confirmed by Petitioners' declarant, Dr. MacFarlane, who testified, "I believe that a POSITA would have understood, based on Corke's disclosure, that the threshold comparisons are ***performed by the control unit***, which sends a signal to the optical switch based on the results of the comparison." Ex. 1202, ¶175 (emphasis added).

Although Dr. MacFarlane then concludes "a POSITA would have understood that the comparator output indicates to the control unit whether a threshold value has been crossed by the received optical signal" because the control unit sends the signal based on the comparisons, he completely fails to explain how a signal can be "received" by the same unit that generated it (and which is capable of setting values for the thresholds). *Id*. Moreover, to the extent Petitioners are relying on a theory of obviousness, neither they nor their declarant explain why a POSITA would have been motivated to relocate the digital comparators of Corke outside of the "detector controller" purported to exist in Corke's control unit 10.

Accordingly, Petitioners' challenges based on Corke, Swanson, and Chikama fail, and no trial should be instituted against claims 8 and 22 based on these references.

7. Ground 1b Fails as it Relies on Mock in Combination with Choy, Swanson, and Chikama, But Petitioners' Misguided Combination Fails to Disclose All Claimed Features

Claim 13 depends from claim 1, and recites "[t]he ***transceiver card*** as recited in claim 1 ***further comprising*** a first splitter splitting the optical signal to the energy level detector, and a second splitter for an OTDR." (emphasis added). Claim 25 depends from claim 14, and similarly requires the claimed "transceiver card" of claim 14 to further comprise "a second splitter for an OTDR." Petitioners acknowledge that Corke, Swanson, and Chikama fail to disclose these features

(Pet., 40-41), and contend that a POSITA "would have been motivated, based on Mock's teachings, to include a second tap coupler or splitter for an OTDR signal in Corke's optical device to enable identifying the location of a fault." Pet., 42-43.

But this misguided combination fails to disclose every feature of the challenged claims. Both the WDM 22 and WDM 26 are arranged in an SLGX switch assembly 19, which is arranged along a receiver path (or fiber) 16, ***and separately from a receiver location 18***. As Dr. Goossen explains, WDMs 22, 26, and 28 are each arranged in an SLGX switch assembly 19 along the fiber according to Mock's Fig. 1. Ex. 2033, ¶67. Additionally, Mock's SLGX switch assembly "houses [the] monitor photodiode 21" and Mock makes clear that the WDMs 22, 26, and 28 are arranged in the switch assembly housing, referred to as the SLGX switch assembly, and are not co-located with any transmitter or receiver on a transceiver card. Ex. 2033, ¶67; Mock, 5:42-43. Notably, Dr. MacFarlane admitted at deposition that he had not considered that teaching, and did not know whether an SLGX switch assembly constitutes a housing. Ex. 2032, 97:12-97:13.

Neither Corke, Swanson, Chikama, nor Mock discloses arranging the WDMs on a transceiver card rather than in the SLGX switch assembly. Therefore, it would not have been obvious to relocate the WDMs of Mock from an SLGX switch assembly and arrange them on a transceiver card. Thus, Corke, Swanson, and Chikama in view of Mock fails to disclose either WMD 22 or WDM 26 on a

single "transceiver card" with the other claimed elements of claims 1 or 14. Indeed, Petitioners fail to even consider the requirement that the claimed "splitter for an OTDR" in claims 13 and 25 must be arranged on the same "card" appearing in the respective independent claim.

In sum, these defects in the obviousness analysis confirm that a POSITA faced with Corke, Swanson, Chikama, and Mock would not have been motivated to arrange all the claimed elements of claims 13 and 25, as arranged in the claims. For these many reasons, including the underlying defects of their Ground 1a challenges, of claims 1 and 14, Petitioners' Ground 1b challenges to claims 13 and 25 must fail.

B. Grounds 2a, 2b, and 2c Fail

As introduced above, Choy and DeSalvo implement different schemes for demultiplexing and processing multiplexed signals. As Dr. Goossen explains, DeSalvo implements a Broadcast-and-Select scheme whereby a printed circuit card assembly 31 receives a multiplexed signal, amplifies the signal and passes it through a tunable bandpass filter that selects a desired channel. Ex. 2033, ¶71. The selected channel is the passed to an optical-to-electrical conversion circuit for processing. *Id*. On the other hand, Choy receives the multiplexed signal at a WDM unit having a grating for demultiplexing the signal. Ex. 2033, ¶70. The demultiplexed signals are then each passed to a corresponding laser/receiver card

(LRC), which routes the signal directly to a PINFET detector for optical-to-electrical conversion. Ex. 2033, ¶¶70, 72-73. Thus, unlike DeSalvo printed circuit card assemblies, Choy's LRCs do not receive multiplexed signals and do not need to preamplify the received signal prior to detection. Ex. 2033, ¶¶70, 72-72, 76.

Because these references apply different schemes for demultiplexing and selecting a desired channel for processing, the preamplification and filtering disclosed in DeSalvo would not have been added to Choy as explained below.

1. Grounds 2a, 2b, and 2c Fail Because Petitioners Fail to Provide Any Legitimate Reason to Modify Choy Based on DeSalvo

Casting serious doubt on the logic behind Petitioners' proposed modification of Choy in view of DeSalvo, at deposition Dr. MacFarlane was either unable or unwilling to annotate a clean copy of Choy's Fig. 3A to add the preamplifier and tunable bandpass that he proposed to incorporate into Choy from DeSalvo. Ex. 2032, 125:20-128:8. This occurred even though Dr. MacFarlane testified that he had been preparing for deposition for roughly two weeks, and that he spent the majority of his time reviewing his declaration. Ex. 2032, 9:16-18; 10:2-11:2. He also confirmed that he reviewed Choy and DeSalvo in preparation for his deposition. Ex. 2032, 98:2-4.

When asked why he would not draw his proposed modification, he explained that he didn't "feel comfortable drawing in exact[ly] all the connections." Ex. 2032, 126:17-18. He was then asked "How many connections

are needed?" Ex. 2032, 126:20. Without ever answering the question, he stated instead, "I'd have to think about that." While he claimed that he thought about that question "to some extent" while preparing his declaration (Ex. 2032, 127:2), he remained unable[12] or unwilling to recreate his theory for combining Choy at DeSalvo at deposition. In light of this testimony on cross-examination, Dr. MacFarlane's declaration in support of the Petition combination should be given little to no weight under the Board's regulations. 37 C.F.R. § 42.65(a),

a) Petitioners allege multiple reasons to modify Choy in view of DeSalvo, but none withstand scrutiny

Petitioners begin with Choy, alleging that it discloses a "laser/receiver card with transmitter and receiver sections" (Pet., 11). Though Dr. MacFarlane inexplicably could not recall the specifics of the proposed modification to Choy at deposition, Petitioners seek to place a portion of DeSalvo's optical receiver arrangement on Choy's laser/receiver card (referred to in Choy as an "LRC"), where that arrangement uses an erbium doped fiber amplifier (EDFA) and a tunable bandpass filter. Pet., 13. Petitioners' proffered reasons to incorporate DeSalvo's EDFA preamplifier and tunable bandpass filter include:

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[12] "Q: But you can't draw it, sitting here in front of me today?"

"A: That's correct."

Ex. 2032, 127:3-5.

-to "counter demultiplexing losses,"

-to benefit "large channel count and high data rate systems,"

-to allow "increased transmission distances," and

-to allow "'PIN detectors to be used.'"

Pet., 14-16. But these reasons are each an improper excuse made to proceed to the next step of Petitioners' analysis.

Not satisfied with an LRC having DeSalvo's EDFA arrangement, Petitioners further seek to modify DeSalvo's EDFA arrangement to add two of Takahashi's "multiple EDFA structures, which include circuitry that measure input optical signal power, and compare the power to one or more reference values." Pet., 16-19. Only when each of these steps are followed do Petitioners argue a POSITA would have been in possession of the combination sought by Petitioners.

Petitioners' proposed combination has a number of defects, and the combination falls apart because each of the alleged benefits of DeSalvo's EDFA arrangement are either features inapplicable to Choy's LRC or features that Choy's LRC already has. Ex. 2033, ¶¶69-93. As correctly noted by Dr. Goossen, a POSITA faced with Choy and DeSalvo, would not have implemented the modifications proposed by Petitioners. Fig. 2 of DeSalvo, reproduced below,

depicts the arrangement Petitioners seek to add to Choy:

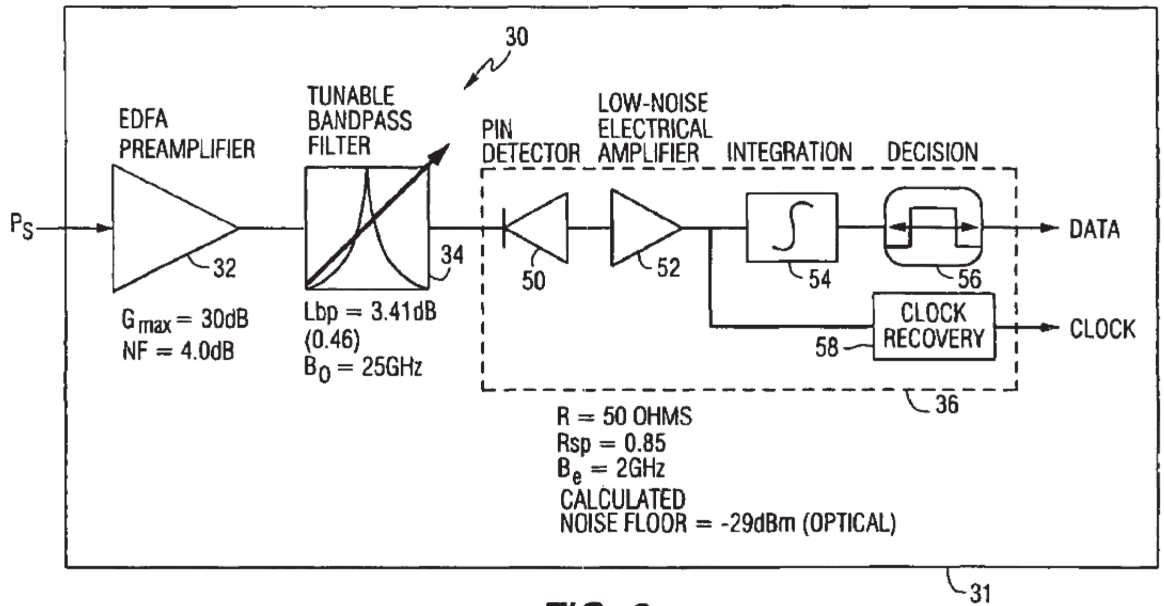


FIG. 2

DeSalvo's EDFA circuit processes multiplexed signals. DeSalvo, 4:44-45 ("The receiver, in one aspect of the invention, uses a single input fiber with multiple wavelengths."). The multiplexed signal on the input fiber is then amplified using an EDFA preamplifier. DeSalvo, 4:45-47 ("a low noise, gain flattened erbium doped fiber amplifier that acts as a preamplifier"). After the multiplexed signal is amplified, the signal is demultiplexed. DeSalvo, 4:47-48 ("a low loss demultiplexer with minimal variation in channel-to-channel output power"). The demultiplexing is performed by the "tunable bandpass filter" element 34 in DeSalvo's Fig. 2. DeSalvo, 6:49-57. A receiver, which includes a PIN detector,

acts on the demultiplexed signal. DeSalvo, 4:49-50 ("A receiver array then follows and includes in each receiver a PIN detector and high speed electronics").

b) Petitioners' rationale—to "counter demultiplexing losses"—fails because Choy's LRC receives a demultiplexed signal

Comparing DeSalvo's arrangement with Choy's LRC, Choy's LRC receives a signal having a single channel. Pet., 50-51 ("Choy teaches that the receiver section of LRC 20 includes connector 54 … that receives a demultiplexed optical signal from grating 24 via a second single mode optical fiber"); *see also* Choy, 3:1-3; ~4:42-44 (disclosing that each IOC/ LRC pair is associated with only a single channel). Thus, Choy's LRC does not face "demultiplexing losses" like DeSalvo has, because ***Choy's LRC does not perform demultiplexing***. Correctly applying DeSalvo's teaching to Choy would have, at most, supported incorporating a preamplifier before Choy's demultiplexer of grating 24, but not into Choy's LRC. Ex. 2033, ¶¶80, 84-85, 87. However, this modification would not satisfy the elements of the challenged claims requiring the claimed "energy level detector" to be on the transceiver card, or optically connected between the fiber input and the receiver on the transceiver card.

Dr. MacFarlane contends that the presence of the demultiplexer in DeSalvo, specifically tunable bandpass filter 34, does not detract from the benefits of adding an EDFA arrangement to Choy's LRC. He states, "a POSITA would have understood that this additional functionality of the bandpass filter—to filter out

EDFA noise—would make such a bandpass filter useful as an optional component in an optical receiver that already receives a demultiplexed signal" and "would still be useful to remove the EDFA noise from the optical signal output by the EDFA preamplifier." Ex. 1202, ¶92.

This reasoning makes no sense regarding Choy's single channel LRC, which has already received a demultiplexed signal (i.e. a filtered signal) from the demultiplexer of grating 24. *See* Ex. 2032, 103:4-10, 104:7-19, 117:6-10, 129:9-17. The EDFA preamplifier arrangement in DeSalvo exists to avoid "demultiplexing losses." But DeSalvo preamplifies the signal ***before*** passing it through the bandpass filter to counter losses, not after demultiplexing as Petitioners propose to modify Choy. Ex. 2033, ¶¶80, 84-85, 87. Accordingly, Petitioners' "demultiplexing losses" rationale for modifying Choy's LRC does not support incorporating an EDFA preamplifier to Choy's LRC, between connector 54 and PINFET detector 56.

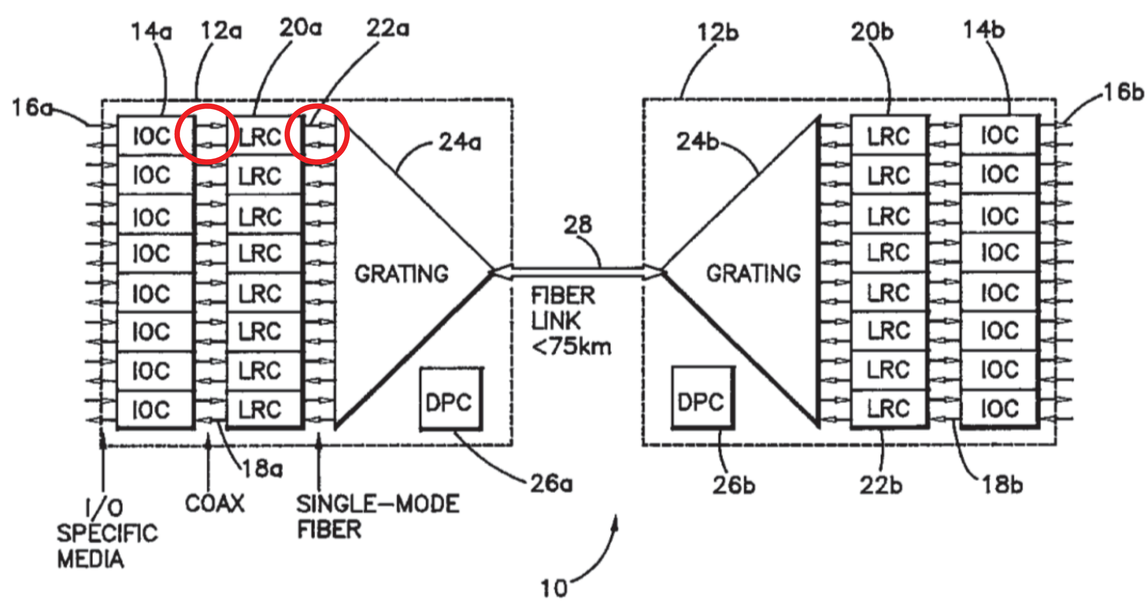
c) Petitioners' rationale—to benefit "large channel count and high data rate systems" fails because Choy's LRC operates on a single channel

For similar reasons, Choy's LRC would not benefit from a "large channel count and high data rate," as Choy's LRC employs single channel input and output signals. Choy purposefully uses different LRCs each outputting to a multiplexer to provide a large channel count. *See* Choy, 3:1-3, 4:42. Choy makes clear that if

additional channels were desired, additional LRC/IOC pairs would be added at both the transmit and receive nodes of the WDM system. Ex. 2033, ¶89. Accordingly, a POSITA seeking to increase the channel count of Choy's LRC would not have found an EDFA preamplifier, added to each LRC, as a solution.

d) Petitioners' rationale—to allow "increased transmission distances"—fails because Choy's LRCs Communicate Short Distances, Directly with Other Cards Within Choy's Unit

Petitioners' "increased transmission distances" rationale also fails. A single channel signal on Choy's LRC is provided directly to other components within Choy's device. As shown below, the LRC cards exist within Choy's unit and transmit data between Choy's IOCs and grating (Fig. 1, emphasis added):



Further, Choy already discloses a solution for increasing a transmission range, and suggests use of "an erbium-doped optical fiber 28 to increase the range

of transmission and the maximum bit rate," (Choy, 10:1-2), which would be interpreted by a POSITA as an EDFA repeater along the fiber 28. Ex. 2033, ¶88. Choy also discloses an amplifier 58 in LRC 20 to amplify the output of Choy's optical detector 56 (which may be a PINFET). Choy, 6:27-30; Ex. 2033, ¶¶86-87.

Additionally, a POSITA seeking to increase the transmission range of Choy's WDM system would not have waited until after the received signal was demultiplexed by the grating, and the demultiplexed signals were distributed to their corresponding LRCs before amplifying the signals. Ex. 2033, ¶¶86-87.

Accordingly, there is no reason that a POSITA would have modified Choy's LRC to include preamplification as a technique for providing "increased transmission distance" within the unit of Choy.

e) Petitioners' rationale—to allow "'PIN detectors to be used'"—fails as Choy has PINFET detectors.

With regard to Petitioners' final rationale, to allow "'PIN detectors to be used,'" Choy's LRC uses a PINFET detector 56 or avalanche detector. As Dr. MacFarlane confirmed at deposition (to the best of his recollection (*see* Ex. 2032, 199:2-120:5)) and as Dr. Goossen confirmed, a PINFET detector 56 includes detection and amplification functionality. *See* Ex. 2032, 117:16-118:13; Ex. 2033, ¶82. An avalanche detector also boosts the gain of the incoming signal, although Dr. MacFarlane was not familiar with an avalanche detector's operation. Ex. 2032, 119:2-120:5; Ex. 2033, ¶82.

DeSalvo discloses the use of an EDFA amplifier in lieu of a detector/amplifier module such as an avalanche detector. As Dr. Goossen explains, a POSITA would not have been motivated to add an EDFA preamplifier to Choy's LRC where that LRC already included a detector possessing amplification capabilities. Ex. 2033, ¶¶82-83.

Further, such an argument is legally unsound. The Board has frequently confirmed that a combination may be improper if the element added from the second reference is already present (or if its functionality is already present) in the first reference. *See TRW Automotive U.S. LLC v. Magna Electronics, Inc.*, IPR2015-00972, slip op. at 15, 17 (PTAB Sept. 16, 2015) (Paper 9) (finding no reason to combine where "the camera in [the '094 patent] already is mounted to the windshield using a bracket and does not require the direct optical coupling provided by the fastening device in [the '633 patent]"); *see also Stryker Corp. v. Karl Storz Endoscopy America, Inc.*, IPR2015-00764, slip op. at 13 (PTAB Sept. 2, 2015) (Paper 13) ("[W]e fail to see, and Petitioner does not adequately explain, why it would be obvious to add a translator to redundantly perform the function that Petitioner maintains is performed by the interconnect devices and network computer located within the surgical network.").

Accordingly, there is no need to add DeSalvo's EDFA preamplifier to provide an amplification feature already found in Choy.

Petitioners' proposed addition of Takahashi's structures, sought to satisfy the "energy level detector" elements of claims 1 and 14, similarly fail. Petitioners add these elements for no other reason than to control the EDFA proposed to be added to Choy's LRC in view of DeSalvo. Pet., 16-19. As there is no need for an EDFA in Choy's LRC, there is no need to add the structures of Takahashi to Choy's LRC.

As the Petition provides no valid reason to combine Choy with DeSalvo, Petitioners' challenges based on Choy, DeSalvo, and Takahashi fail, and claims 1-12 and 14-24 survive against the challenges based on these references. Ex. 2033, ¶¶69-98.

2. Ground 2c Fails Because Petitioners Fail to Show Why a POSITA Would Have Used Phase-Modulation of Input Data in the Proposed Combination of Choy, DeSalvo, and Takahashi

Ground 2c challenges dependent claims 3, 4, 10, 17, and 18, which each require phase-modulation of optical signals. *See* Ex. 2101, 15.

Petitioners do not contend that Choy, DeSalvo, or Takahashi discloses phase modulation. Instead, Petitioners cite to Fatehi to show that "phase modulation was known to those of skill to be used by external modulators." Pet., 61. But Choy discloses intensity (or amplitude) modulation, as confirmed by Dr. MacFarlane at deposition. Specifically, at deposition, Dr. MacFarlane was asked about Choy's disclosure at 9:20-24, and after evaluating this disclosure, he concluded that Choy

is disclosing that its WDM system uses intensity or amplitude modulation. Ex. 2032, 122:9-123:11.

In view of this teaching, Petitioners do not cite to any reason why a POSITA would modify Choy to use phase modulation. Pet., 61-62. The closest Petitioners come to an attempted motivation is found in the statement, "Fatehi notes that 'the use of an external modulator enables the phase of the light from the laser to be preserved,' such as 'in systems which utilize phase shift keying (PSK) modulation techniques.'" But the presence of an "external modulator" is a feature that Petitioners contend is already found in Choy (*see* Pet., 61 ("it was well-known to use external modulation, as contemplated by Choy")). And the mere existence of phase modulation does not provide a motivation to incorporate phase modulation into Choy. Indeed, an obviousness analysis requires more than common technology and even more than a possibility that two references could be combined. As the Federal Circuit has held, just because a POSITA ***could*** have combined two references does not mean that a POSITA ***would*** have combined them. *Personal Web Technologies, LLC v. Apple, Inc.*, 848 F.3d 987, 993–94 (Fed. Cir. 2017). Thus, Petitioners have provided no motivation to provide Choy with external modulation based on Fatehi.

3. Ground 2a Fails as Petitioners' Proposed Combination Fails to Show a "Linear or Logarithmic Amplifier Scaling an Output" of a Photodiode, as Required by Claims 5 and 19

Petitioners' challenge to dependent claims 5 and 19 based on Choy, DeSalvo, and Takahashi also fails. As already introduced above, claim 5, which depends from claim 1, and claim 19, which depends from claim 14, each require "a photodiode and a linear or logarithmic amplifier scaling an output of the photodiode."

Petitioners' analysis directs the Board to Takahashi's FIG. 9 and its "calculation circuit 16." Pet., 64. Petitioners contend that "calculation circuit 16 includes an 'operational amplifier 48' (yellow) to perform subtraction ***on the optical signals input*** to the calculation means." *Id*. (emphasis added).

Putting aside whether Petitioners have adequately established that the input to operational amplifier 48 are optical signals, Petitioners have not established that the operational amplifier is a "linear or logarithmic amplifier" or that the signals input to the operational amplifier are "scaled." Instead, Petitioners contend that "linear subtraction" is performed, without attempting to link "linear subtraction" to a "linear or logarithmic amplifier" or "scaling." Petitioners' declarant similarly fails to make such a showing. *See* Ex. 1202, ¶244 (asserting that "subtraction is a [linear] operation" and paraphrasing the Petition). Thus, Petitioners have not adequately shown the presence of "a linear or logarithmic amplifier scaling an

output of the photodiode," as recited in claims 5 and 19.

Accordingly, Petitioners' challenge based on Choy, DeSalvo, and Takahashi fail, and claims 5 and 19 must survive this challenge.

C. Petitioners' Challenges Fail to Account for the Examiner's Decision to Allow the '898 Patent Over Chikama and Choy

The Chikama and Choy references were relied upon by Petitioners in all Grounds asserted in their Petition. However, Petitioners' have failed to inform the Board of the examiner's consideration[13] of the Chikama and Choy references during prosecution of the '898 patent. Chikama and Choy were considered by the same USPTO patent examiner during prosecution of the '327 and '511 patents, parents to the '898 patent, after having been disclosed by the applicant to the USPTO patent examiner via an information disclosure statement.

Petitioners incorrectly contend that none of the references "was considered by the Examiner during prosecution of '898 Patent." Pet., 20, 43. In reality, each of the Grounds includes references already considered by the Examiner, and the '898 patent was allowed over those references. According to USPTO examination policy, "[t]he examiner of the continuing application will consider information

[13] The examiner for the '898 patent, Dzung D. Tran, also examined parent patents to the '898 patent, including the '327 patent and the '511 patent. Ex. 1201, 1; Ex. 2015, 1; Ex. 2016, 1.

which has been considered by the Office in the parent application." M.P.E.P. § 609.02 (Rev. March 2014). From Grounds 1a and 1b, Chikama is cited on the face of the '327 patent (Ex. 2014, 2), and was submitted in an IDS by the applicant and considered by the Examiner during prosecution. *See* Ex. 2001, 263, 377. From Grounds 2a, 2b, and 2c, the primary reference relied upon by Petitioners, Choy, was considered by the Examiner, and the '898 patent was allowed over Choy. *See* Ex. 2001, 165, 180. In essence, by arguing that Chikama and Choy were not considered by the Examiner, Petitioners are accusing the Examiner of failing to abide by USPTO examination policy without any evidence to support such accusation.

Consistent with Petitioners' failure to recognize that Chikama and Choy were considered by the Examiner, Petitioners fail to address this prosecution history in their Petition, and they make no attempt to show that their interpretation of Chikama or Choy is different than how the Examiner interpreted Chikama and Choy when allowing the '898 patent to issue over these references.

V. RETROACTIVE APPLICATION OF INTER PARTES REVIEW ON PRE-AIA PATENTS IS CONSTITUTIONALLY IMPERMISSIBLE

At the time Patent Owner's patent issued, the express provisions of the Patent Act did not make patents revocable through *inter partes* review. The Supreme Court's decision in *Oil States Energy Services, LLC v. Greene's Energy Group*, *LLC*, 138 S. Ct. 1365 (2018) does not resolve the constitutionality of using

inter partes review to extinguish a pre-AIA patent such as the '898 patent. Retroactively subjecting Patent Owner's vested patent rights to new qualifications—including possible cancelation by a newly constituted, non-Article III body operating under new statutes, rules, and procedures, including procedures contrary to 35 U.S.C. § 282(a)—presents a constitutional concern sufficient to preclude invalidation of the claims.

VI. CONCLUSION

For the reasons presented above, all of the Petition's grounds challenging the validity of the '898 patent claims are improperly supported, and the patentability of claims 1-25 should be confirmed by final written decision.

Dated: August 29, 2018

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CERTIFICATE OF WORD COUNT

The undersigned certifies that the foregoing PATENT OWNER'S RESPONSE complies with the type-volume limitation in 37 C.F.R. § 42.24(b)(2). According to the word-processing system's word count, the brief contains 13,874 words, excluding the parts of the brief exempted by 37 C.F.R. § 42.24(a).

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CERTIFICATE OF SERVICE

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